

## ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc.. Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

10052225 ZA

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

☐

CD(s) containing computer program listing

Doc Code: Computer

Artifact Type Code: P

☐

Stapled Set(s) of Extra Color Drawings/Photographs

Doc Code: Artifact

Artifact Type Code: C

☐

CD(s) containing pages of specification  
and/or sequence listing

☐

Doc Code: Artifact

☐

Artifact Type Code: S

☐

CD(s) with content unspecified

Doc Code: Artifact

Artifact Type Code: U

☐

Microfilm(s)

Doc Code: Artifact

Artifact Type Code: F

☐

Video tape(s)

Doc Code: Artifact

Artifact Type Code: V

☐

Model(s)

Doc Code: Artifact

Artifact Type Code: M

☐

Bound Document(s)

Doc Code: Artifact

Artifact Type Code: B

☒

Other, description:

US Patent

Doc Code: Artifact

Artifact Type Code: Z

The  
United  
States  
of  
America



The Commissioner of  
Patents and Trademarks

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.*

*If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.*

*If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.*

*Bence Lehman*

Commissioner of Patents and Trademarks

*Pandra J. Morton*

Attest

## NOTICE

*If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number and timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.*



US005679313A

United States Patent [19]

[11] Patent Number: 5,679,313

Nojima et al.

[45] Date of Patent: Oct. 21, 1997

[54] AMMONIA DECOMPOSITION CATALYSTS

02107265 4/1990 Japan.

[75] Inventors: Shigeru Nojima; Rie Tokuyama;  
Kouzo Iida, all of Hiroshima, JapanPrimary Examiner—Wayne Langel  
Attorney, Agent, or Firm—Michael N. Meller[73] Assignee: Mitsubishi Jukogyo Kabushiki  
Kaisha, Tokyo, Japan

[57] ABSTRACT

[21] Appl. No.: 472,057

An ammonia decomposition catalyst wherein a first catalyst having a crystalline silicate which is represented by the formula in terms of molar ratio of oxides as dehydrated:

[22] Filed: Jun. 6, 1995

[51] Int. Cl.<sup>6</sup> ..... C01B 3/04

wherein R denotes an alkaline metal ion and/or hydrogen ion, M denotes a VIII Group element, rare earth element, titanium, vanadium, chromium, niobium, antimony or gallium, M' denotes magnesium, calcium, strontium or barium,  $a \geq 0$ ,  $20 > b \geq 0$ ,  $a+c=1$ ,  $3000 > y > 11$  or a specific porous material as a carrier and iridium or a noble metal as an active metal is present together with or covered with a second catalyst having at least one element selected from the group consisting of titanium, vanadium, tungsten and molybdenum, if necessary, as well as a method of using the same.

[52] U.S. Cl. .... 423/237; 423/351; 423/658.2

[58] Field of Search ..... 423/328.2, 237,  
423/351, 658.2; 502/64, 66

[56] References Cited

## U.S. PATENT DOCUMENTS

5,338,715 8/1994 Iida et al. .... 502/64

## FOREIGN PATENT DOCUMENTS

4020914 1/1992 Germany ..... 423/237  
53-132465 11/1978 Japan ..... 423/237

7 Claims, 1 Drawing Sheet

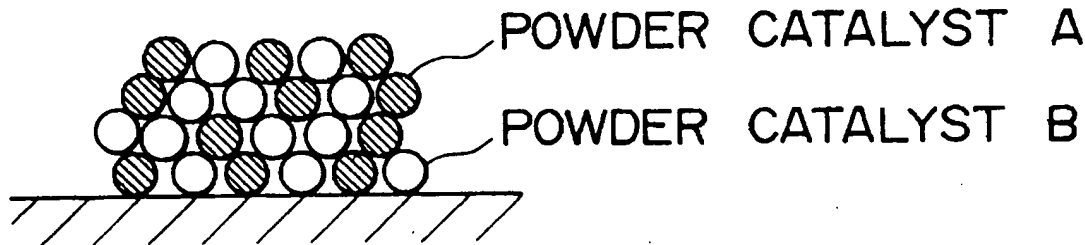
MONOLITH SUBSTRATE  
(CORDIERITE)

FIG. 1

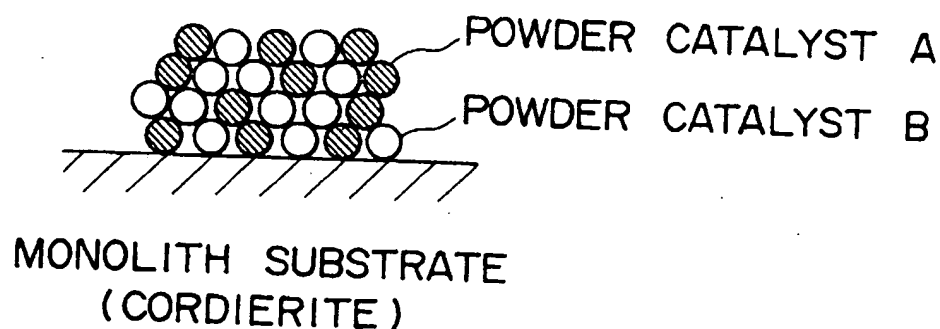


FIG. 2

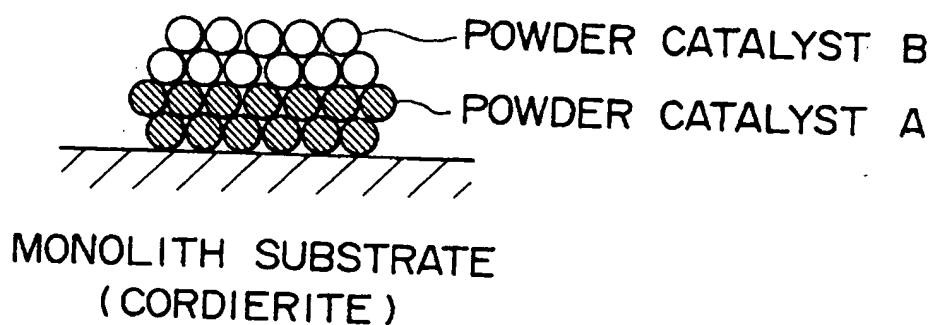


FIG. 3

